

Date.	Observer.	Duration of Watch.	From—To.	Result.
1898. Nov. 14	A. J. R.	4 ^h 15 ^m	10 ^h 45 ^m to 15 ^h	No meteors seen. Very cloudy up to 12 ^h 15 ^m , and then completely overcast. Slight rain at 13 ^h .
	T. H.	2 ^h	11 ^h to 13 ^h	No meteors seen. Sky cloudy.
	R. C.	44 ^m	17 ^h to 17 ^h 44 ^m	Sky clear overhead, although cloudy up to altitude of 20°. Three well-marked Leonids (1–2 mag.), starting 20° from radiant, of which two moving towards tail of Ursa Major and one towards Orion. Another meteor (1 mag.) from end of tail of Ursa Major towards Leo.
Nov. 15	A. J. R.	5 ^h 35 ^m	11 ^h 25 ^m to 17 ^h	No meteors. Sky cloudy all night.

On the 13th R.C. also saw two large bolide-like meteors fall to the south from a point overhead, and a resident on Blackford Hill saw five large meteors fall into the constellation *Cetus* from a direction S.E. of the zenith. Most of these could be referred to a radiant near *Pollux*.

The Rev. A. Mackay, Westerdale Manse, Halkirk, Caithness, has written to me that on November 14 in clear intervals between 11^h 16^m and 13^h 23^m he saw fourteen meteors in all, of which eleven were possible *Leonids*.

A whole-plate camera equatorially mounted and provided with a driving clock was kept in readiness each night, under the care of A. J. R.; but no plates were exposed owing to the scarcity of meteors.

Observations of the Leonids, 1898 November, made at the Cambridge Observatory. By Arthur R. Hinks, B.A.

(Communicated by Sir Robert Ball.)

In my attempt to observe the *Leonids* this year I was fortunate in having the help of the members of the class to which I have had the pleasure of teaching practical astronomy this term. To Messrs. R. C. Maclaurin, Fellow of St. John's College; L. N. G. Filon, advanced student, King's College; H. E. Wimperis, advanced student, Caius College; R. Casson, A. B. Field, J. H. Field, and M. Walker, undergraduates of St. John's College, my thanks are due for their energetic help under very depressing circumstances.

Our programme was to watch from 11^h 0 until dawn on November 13, 14, 15, and to attempt three things: a continuous count of the number of meteors visible per five minutes; a record of as many paths as possible from visual observations; and a

photographic record of paths within 5° of the radiant, with a 5-inch portrait lens mounted on the Northumberland Equatorial.

The nights of 1898 November 13 and 15 were entirely cloudy, and nothing whatever was seen.

The night of 1898 November 14 was slightly more favourable. The clouds were almost continuous, but very thin in places, with an occasional break almost clear. Photography was quite out of the question. There were not enough stars visible to allow us to record any paths visually. But during a continuous watch by two or more observers from 11^h to 18^h we counted altogether thirty-six meteors, of which perhaps thirty-two were *Leonids*.

A list of the meteors seen, with extracts from our notes, is given below. We have marked with an L all those which, so far as we could judge through the clouds, were *Leonids*. The recorded magnitudes are of scarcely any value, owing to the continually varying thickness of the cloud.

G.M.T.		Magnitude.	Streak.	
13 54	L	V. bright	Green phosphorescent	Lit up the clouds
14 10	Not a Leonid			
14 15	L	1	Gr. phosph.	
From 14 ^h 0 ^m to 14 ^h 35 ^m was partially clear in the east: Stars visible down to about 4 ^m sometimes. Certainly no fine shower in progress.				
14 51	?L	1½	S	
From 14 ^h 45 ^m to 14 ^h 55 ^m was partially clear.				
15 8	L	V. br.		Through thick cloud
15 27		General flash; unlocatable		
15 40	L	Br.		
15 48	Not a Leonid			
16 0	?L	2	NS	
16 5	L			
16 6	L	Br.	S	
16 9	L			
16 11	?L			
16 16½	L			
16 17	L	2	NS	
16 18	L	1	NS	
16 23	L	1		
16 24	L			
16 32	L	3		
16 33	Not a Leonid	V. bright, long green streak		
16 35	?L	Extremely bright.	Slow, lit up sky	

G.M.T.		Magnitude.	Streak.
16 40	L	Br.	
16 44	Not a Leonid	Faint.	
16 44½	L	1	S
16 45	L	1	S
16 47	L	2	
16 47½	L	2	

From 16^h 0^m to 16^h 50^m it was partially clear, and a good proportion of the brighter meteors must have been recorded. After this the clouds gradually became thicker.

16 51	L		
16 52	L		
16 56		A flash	
16 59	L	Faint	
17 7		A flash	
17 12	? L	2	NS
17 15	L	3	S
17 16	? L	2	
17 40	? L	1	S

In the column headed “streak” the letter S means that it is recorded that the meteor left a streak, but that no details of its colour are given. The letters NS mean that it is recorded that no streak was visible.

It is quite probable that some of the meteors recorded as *Leonids*, but with the note “no streak,” were really from the radiants near *Leo*, which are active about the same time. In other cases the streaks were doubtless hidden by cloud.

If on comparison with the results of observers in other longitudes it is found that we were fortunate enough to have a partial view of the maximum of this year’s shower, I think we may conclude from these observations that the maximum did not furnish a very brilliant display, and that when the Earth in 1898 passed through the node of the *Leonids*’ orbit, the front of the main group of meteors was still at some distance.

Cambridge Observatory :
1898 November 18.

Ephemeris for Physical Observations of the Moon for the First Half of 1899. By A. C. D. Crommelin.

Greenwich Noon. 1899.		Selenographical Colong. Lat. of the Sun.		Geocentric Libration Sel. Long. Lat. of the Earth.		Combined Amount.	Direction.
Jan.	1	143°21	+ 0°06	- 4°58	+ 5°32	7°02	40°7
	2	155°36	0°09	5°71	6°09	8°34	43°2
	3	167°50	0°11	6°63	6°61	9°35	45°1
	4	179°65	0°14	7°30	6°82	10°00	47°0
	5	191°81	0°17	7°63	6°70	10°15	48°7
	6	203°97	0°20	7°59	6°24	9°79	50°6
	7	216°14	0°23	7°12	5°41	8°97	52°8
	8	228°32	0°26	6°22	4°23	7°53	55°8
	9	240°51	0°29	4°91	2°76	5°65	60°7
	10	252°69	0°32	3°24	+ 1°06	3°40	71°9
	11	264°89	0°35	- 1°33	- 0°74	1°52	119°1
	12	277°08	0°38	+ 0°71	2°50	2°60	195°9
	13	289°28	+ 0°41	2°70	4°07	4°88	213°5
	14	301°47	0°44	4°48	5°36	6°97	219°9
	15	313°65	0°47	5°96	6°23	8°60	223°7
	16	325°83	0°49	7°01	6°70	9°67	226°3
	17	338°00	0°52	7°57	6°78	10°14	228°2
	18	350°16	0°55	7°74	6°48	10°06	230°1
	19	2°32	0°57	7°47	5°86	9°49	231°9
	20	14°47	0°60	6°82	4°97	8°46	233°9
	21	26°62	0°62	5°89	3°87	7°07	236°7
	22	38°76	0°65	4°74	2°62	5°40	241°1
	23	50°90	0°67	3°44	- 1°26	3°65	249°9
	24	63°04	0°69	2°06	+ 0°13	2°06	273°6
	25	75°17	+ 0°71	+ 0°64	1°52	1°64	337°2
	26	87°31	0°74	- 0°75	2°84	2°93	14°8
	27	99°44	0°76	2°10	4°03	4°55	27°5
	28	111°58	0°78	3°35	5°06	6°07	33°5
	29	123°71	0°80	4°48	5°88	7°41	37°3
	30	135°85	0°83	5°47	6°43	8°42	40°4
	31	147°99	0°85	6°28	6°70	9°18	43°1
Feb.	1	160°14	0°88	6°88	6°65	9°56	46°0
	2	172°29	0°90	7°22	6°28	9°53	49°0
	3	184°45	+ 0°93	- 7°28	+ 5°58	9°17	52°5